Mobile learning in teacher training

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Abstract This paper describes a mobile learning project, where mobile devices are used for educational activities. The main focus of this paper is teacher training. Experiences on the use of mobile technology and how it was used in teacher training, especially how trainees and supervising teachers felt about it, are presented. The pilot study was carried out at the Department of Home Economics and Craft Science in University of Helsinki. The idea of the pilot was that the supervising teacher and trainee students could discus and share their ideas about teaching methods through the mobile device and use of a short message service (SMS) and digital pictures as a part of the supervising process. The use of digital pictures which were delivered via the mobile device proved to be surprisingly successful. The goal of these innovative pilot projects is to create flexible teaching solutions, which will enable access to information using different devices, and support learning in a variety of situations.

Keywords: Case Study; Change; Distributed; Handheld; Interview; IT-use; Mobile; Teachers; Training; Wireless

Introduction

According to Quinn (2000) 'Mobile learning is learning through mobile computational devices'. Shepherd (2001) says 'M-learning is not just electronic, it's mobile'. One feature of mobile learning is the opportunity to break away from teaching that takes place in a classroom, and to move to another location while communicating via information networks. Another distinctive feature of mobile learning is that it enables learners to enter an information network at the precise moment when necessary by using a portable learning device and a wireless network. Mobile learning may be considered as an extreme form of flexible learning. The mobile environment integrates studies that take place on campus, at home or outside university facilities into one shared, flexible learning environment.

Kynäslahti (2003) identifies three different elements for mobility and all of these are valuable to teachers and students whilst they are teaching and learning:

- convenience
- expediency
- immediacy

Teachers are able to work anywhere even if that requires access to the Internet or a connection to other kinds of electronic environments.

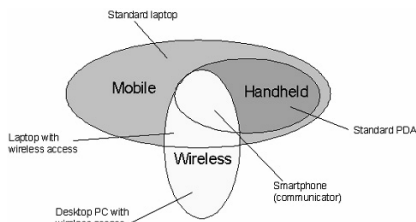Also, the word mobility can be defined from a technical point of view.

Fig. 1. Defining the mobile device

Figure 1 provides a pictorial definition of the mobile devices used in the pilot study. An example of a mobile device is a standard laptop computer. Adding the hand-held feature to the mobile feature creates a standard PDA (personal digital assistant) device. These devices (laptop and PDA) do not yet offer the required capacity to carry out the tasks which were to be undertaken in this project; wireless access to the network was also required together with the functionality of using a web-browser. The Nokia Communicator 9210 satisfied all these criteria. By using a browser the user could upload digital pictures which were an important party of the learning activity.

Since the middle of the 1990 s several teachers and researchers in the University of Helsinki have experimented with mobile technology in teaching and learning. The first project was the LIVE–project (Learning in a Virtual Environment) in 1997–99 (Nummi *et al.*, 1998; Sariola *et al.*, 2001). A second project, the UniWap project began in June 2000 as a joint venture between The Educational Centre for ICT in University of Helsinki and the software company ICL Invia. In this project a WAP-based project environment was developed, which used a shared database. In practice, this meant that if teachers came up with a good idea, they could immediately use a WAP phone to enter the idea in the database. This first Uniwap pilot was tested by 25 university teachers for personnel training in 2001.

Based on the, Uniwap project, the Educational Centre with its partners, Fujitsu Invia, Oy Radiolinja Ab, The Hypermedialaboratory in University of Tampere and R5Vision, established 'the Mobile Learning project'. The purpose of this project was to develop the production of digital learning materials and develop models of how to teach, study and learn in mobile learning environments. In this project the Uniwap environment was improved, for example by adding a SMS service and the transfer of digital pictures. The Uniwap environment has now been tested in two pilots in the University of Helsinki. The first pilot, which is the main focus of this paper, was carried out in the Department of Home Economics and Craft Science and the second one was carried out in the Department of Forest Resource Management.

Mobility in teacher education in Finland

In Finland, teachers are educated in departments of teacher education or other similar university departments. Teacher education can also include pedagogical studies, which are required qualifications for teachers. Teacher training provides the first practical contact to teacher's everyday life for many students. Students have opportunity to use their knowledge, experiences and personal characteristics and grow into capable teachers. Development of professional identity and skills are supported by a supervising teacher.

At present, Finland has about 5 million inhabitants, of which over 70% have mobile phones. Approximately 98% of university students have a mobile phone, so it can be safely assumed that they are highly experienced users of mobile technology.

A virtual teacher training model has been used (Tuononen & Kurola, 2002). The students are instructed in three different ways: face-to-face instruction; instruction via network-based learning environment and instruction via mobile device. Face-to-

face instruction was the traditional method where student and supervisor engage in a discussion about a particular teaching session. Network-based instruction means that the supervisor uses a learning management system and can deliver training material via the Internet. The third method is the use of mobile devices for instruction.

The main idea of the virtual teacher training instruction model is that students have the opportunity to document all their problems and the issues connected with teacher training. Face-to-face instruction is still the accepted method to instruct a trainee teacher. But now the trainee has the opportunity to ask and go back to the network-based or mobile instruction documents.

The supervisor can use the mobile device for having a real time conference call with the students. In this case the supervisor is able to reach all students even when they are physically scattered in different locations.

A case study on mobility in teacher education

In spring 2002, the Uniwap II pilot study in teacher education was started in The Department of Home Economics and Craft Science. In this 'mobile project' there were 11 students of whom 9 were women and 2 were men between the ages 20 and 25, and five women teachers. The Educational Centre for ICT made available 10 Nokia Communicator 9210s and two digital cameras (Casio QV-3000EX/Ir).

The idea of the pilot was that the teachers and students could discuss teaching issues through the mobile devices and also use SMS-messages and digital pictures as a part of the supervising process. The supervisor (or trainee) could take digital pictures of various teacher training events, learner's actions and different teaching techniques. Pictures could be downloaded to the phone via infrared access. The trainees could open the web-browser and upload the pictures to their material bank in a Uniwap database even before the conclusion of training session. Moreover, the supervisor could write down ideas and feedback 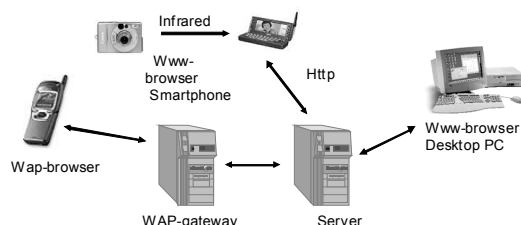related to the training session and send them to the trainees. The trainees then put together a digital portfolio on the basis of these photographs and the network discussion. So in this project it was quite important that, by using mobile device, content could be produced in anywhere especially when the

Fig. 2. Technical implementation of pilot project

content was a digital picture. Figure 2 shows the implementation of this pilot project.

Results

It is critical to study the opportunities which new technology might bring to improve the quality of teaching and learning. Especially, it is important to explore how students themselves use communication technology and how they experience it (cf. Laurel, 1995; Downes, 1995; 1999). At the end of project, there was a group interview in which both teachers and students participated. One of the researchers made notes during the interview which was also taped and transcribed. The themes for the group interview were:
• Why did you use mobile device and where were you when you used it?

- In what situations did you use the mobile device?
- What did the digital pictures tell you in general?
- How did you feel using mobile device as a part of supervising process?

The three different elements of mobility (defined by Kynäslahti, 2003) were examined and compared to the feedback collected from the trainees and teachers.

Convenience

Trainees felt that the reason why they used the mobile equipment was that they wanted to use their waiting moments to conduct educational activities. For example, on the bus or on the train, they wrote notes or memos to be shared with other trainees. They also uploaded pictures from the phone to the material bank. All of these examples deal with convenience. Trainees had opportunity to use their time even when they were on the move.

> 'I used almost all my travelling time to giving feedback to the other trainees via the mobile device', a trainee commented.

Expediency.

Trainees were on the move in some particular place, for example, they worked in a classroom environment and also they conducted activities in many other places while they were on the move. From the expediency point of view trainees pointed out that they had to work at home and there they did not have access to Internet other than via the phone. Trainees also said that they used phones in shops when they had to check if there was particular foodstuff at school which was needed in a lesson on home economics. In these cases they mostly used audio calls and SMS-messaging. Trainees wanted to move pictures from camera to the phone straightaway but most of the time that happened in classroom. They felt that without mobility working with the camera would not be possible.

Immediacy

This element was the most meaningful for trainees. They liked to be able to act immediately. They made memos and took pictures while they were observing other trainee's lessons and were then able to share these with others. One trainee said that she got a great idea on the way to university in the very early morning and was happy to be able to share this idea with colleagues straightaway. Mobile devices were a great tool to give feedback while observing other trainees.

Supervising teachers' opinions

The supervising teachers' opinions of mobility and the use of mobile devices were also mostly positive.

> 'During training, supervising teachers need to work long hours and for that reason I felt that the use of mobile device helped my work a lot', said supervising teacher.

Teachers need to go from one school to another many times during the day and while they travelled they were able to connect to the shared database. Also the supervising teachers felt that the mobile devices brought more flexibility in their use of time.

There were a number of differences between teachers and trainees in terms of giving feedback. Trainees tended to give immediate feedback to other trainees who they were observing. They acted spontaneously. Teachers were more careful in their provision of feedback and thought more deeply about what to write. For example they would read through the text before they sent it and fixed the misspellings, whilst the trainees typed the text and send it right away.

The extensive use of Uniwap was surprising. Over five weeks there were 388 messages: 54 SMS-messages and 334 digital pictures in the Uniwap database. That is approximately 9.7 messages per day and about 24.3 messages by every participant (teacher or student).

The use of Uniwap was very active at the end of the week because most of the trainee lessons were held then. Supervising teachers sent SMS-messages quite late as by then they had read trainees' plans for lessons and gave feedback via the database. This part of the teachers work usually took place at home and late in the evening. One of them said that when there was the possibility to get in touch with students using the mobile device and the Uniwap database at any time of the day, it helped the supervising process — there was no delay in feedback process.

Fig. 3. SMS-messages in Uniwap by content
'Other' is the pilot co-ordinator from the Educational Centre

Students wrote and sent SMS-messages in Uniwap, but not so often as teachers. An analysis of SMS-message content, shows three kinds of 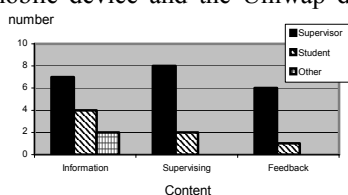activities: information, supervising and feedback (see Fig. 3.). Mostly SMS-messages were used for communicating information. Supervising teachers sent information of the next meetings or notified students that their feedback was now available. Also students notified other students and the supervisor when their plans were ready and needed feedback as illustrated in the following (translated with pseudonyms) examples.

SMS Sending date and time: 19th March, 2002 10.35am
Teacher: I am waiting for Mikko's studyplan. Are you able to come and meet me this afternoon?

SMS Sending date and time: 3rd March, 2002 10.38pm
Teacher: Your feedback is now in 'groupware'. Go for it!

SMS Sending date and time: 1st March, 2002 1.05pm
Student: Laura and Paula need to confirm: Can we order groceries on Monday?

The most interesting finding in the pilot study was the number of digital pictures taken and uploaded/downloaded through the Uniwap-database. The reasons seem to be because the teachers and students found the possibility so much fun and they wanted to take many pictures of every trainee lesson and situation. The facility to transfer pictures and notes right away through the database, enabled everybody to comment and give feedback instantly. This immediacy, the third element of mobility, was very important and without this 'right-away — possibility' the transfer of digital pictures would not have been used so much.

Students thought that the digital pictures were important in the development of their professional identity as teachers of home economics. They saw, even the first time, how they looked in front of an elementary school class and how they taught them. The use of still-pictures helped students and supervisors to see things that they did not notice in real situations. This was very helpful in supervising discussions between student and teacher when students analysed their own teaching methods and made notes in their portfolio.

Koskinen *et al*. (2001) noted in their research that digital pictures without text were not very useful. With text the situation in picture can be placed in a real context; why the situation was interesting or what happened afterwards. In the pilot study, the texts were added to digital pictures during or after they were saved in the

Uniwap-database. Students changed titles of pictures and wrote little messages about what was happening in picture. Supervising teachers provided feedback or asked questions about situations in classroom that were shown in the picture message. These comments about picture messages made them come alive to the people who were not present in actual teaching situations.

Conclusion

The mobile pilot on Home Economics and Craft Science showed that the educational use of mobile devices and the pedagogical opportunities of mobile learning are worth further researching and testing. The Educational Centre for ICT continues to use these innovative methods to support the teaching of other units at the University of Helsinki and expect to extend that to the Finnish Virtual University. The long-term goal is to create flexible teaching solutions, which will enable access to information with all kinds of devices, and to produce materials flexibly in a variety of situations.

Mobile technology is only beginning to take its first steps in academic teaching and learning. The opportunities it creates have been recognised and the idea of a wireless campus is spreading to universities. The integration of the Internet and mobile solutions will transform the use of ICT in teaching and take it in the direction of open teaching, provided that mobile technology is seen as a choice for academic development. The core characteristic of mobile learning is that it enables learners to be in the right place at the right time, that is, to be where they are able to experience the authentic joy of learning.

References

Downes, T. (1995) Children and Electronic Media: The Home-school Connection. In *World Conference on Computers in Education VI, WCCE ´95 Liberating the Learner* (eds. J.D. Tinsley & T.J. Van Weert) pp. 543-552. Chapman & Hall, London.

Downes, T. (1999) Playing with Computing Technologies in the Home. *Education and Information Technologies,* **4,** 1, 65-79.

Koskinen, I., Kurvinen, E. & Lehtonen, T.-K. (2001) *Mobile Image*. IT Press, Helsinki.

Kynäslahti, H. (2003) In Search of Elements of Mobility in the Context of Education. In *Mobile Learning* (eds. H. Kynäslahti & P. Seppälä) pp. 41–48. IT Press, Helsinki.

Laurel, B. (1995) The Nature of Computing. *Educom Review* **30,** 4, 36-42.

Nummi, T., Rönkä, A. & Sariola, J. (1998) Virtuality and Digital Nomadism: An Introduction to the LIVE Project (1997–2000). *Media Education Publications 6. .* Department of Teacher Education, University of Helsinki, Helsinki.

Quinn, C. (2000) mLearning: Mobile, Wireless and In-Your-Pocket Learning. *Line Zine Magazine*. http://www.linezine.com/2.1/features/cqmmwiyp.htm

Sariola, J., Rönkä, A., Tella, S. & Kynäslahti, H. (2001) From Weak Signals to the Concept of mLearning: The LIVE Project Revisited. In *ICT in the Primary School: Changes and Challenges* (eds. A. Loveless & B. Dore) pp. 48–65. Open University Press, Milton Keynes.

Shepherd, C. (2001) *M is for Maybe. Tactix: Training and communication technology in context*. http://www.fastrak-consulting.co.uk/tactix/features/mlearning.htm

Tuononen, K. & Kurola, J. (2002) Verkko-Ohjaus Ja Mobiilisuus Korkea-Asteen Opiskelussa (Net-mentoring & Mobility in Higher Education)*.* In *Mobile learning – Flexibility in moving* (in Finnish) (ed. P. Seppälä) pp. 95-101. The Educational Centre for ICT, University of Helsinki, Helsinki.